

Claims

- 1 1. A device, comprising:
2 a means for performing metal organic vapor phase epitaxy (MOVPE) on a surface
3 of a substrate; and
4 a means for performing hydride vapor phase epitaxy (HVPE) on the surface of the
5 substrate.
- 1 2. The device according to claim 40, wherein said device can transition from
2 MOVPE to HVPE *in situ*.
- 1 3. The device according to claim 41, wherein the substrate does not have to be
2 removed from the device between MOVPE and HVPE.
- 1 4. The device according to claim 42, wherein the substrate can be maintained at
2 elevated temperatures during transition from MOVPE to HVPE.
- 1 5. The device according to claim 41, wherein said device can also transition from
2 HVPE to MOVPE *in situ*.
- 1 6. The device according to claim 44, wherein said device can also transition from
2 HVPE to MOVPE *in situ*.
- 1 7. The device according to claim 45, wherein the substrate can be maintained at
2 elevated temperatures during transition from HVPE to MOVPE.
- 1 8. The device according to claim 40, wherein said device can be used to grow a
2 III-V nitride compound semiconductor onto the surface of the substrate.

1 9. The device according to claim 47, wherein said device can be used to grow GaN
2 onto the surface of the substrate.

1 10. The device according to claim 48, wherein said means for performing HVPE
2 comprises a hot wall reactor having a source zone, and
3 a downstream mixing zone,
4 wherein TMG can be reached with Hcl in the source zone to form a chlorinated
5 gallium species, and wherein the chlorinated gallium species can combine with NH₃ in the
6 downstream mixing zone and directed toward the substrate for deposition of GaN onto the
7 substrate.

1 11. The device according to claim 48, wherein said means for performing MOVPE
2 comprises a low pressure horizontal cold-wall MOCVD reactor.